

What is claimed is:

1. An electric blower comprising:

an electric motor including a stator and a rotor;

5 an impeller being rotated by the electric motor;

an air guide having a plurality of guide blades around
the impeller; and

a casing enclosing the impeller and the air guide,

wherein the casing is provided with a number of
10 exhaust openings through which a part of an air stream
suctioned by the impeller is discharged, and a
circumferential length of each of the exhaust openings is
substantially identical to a circumferential distance
between outer peripheral ends of adjacent guide blades.

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2. An electric blower comprising:

an electric motor including a stator and a rotor;

an impeller being rotated by the electric motor;

an air guide having a plurality of guide blades around
20 the impeller; and

a casing enclosing the impeller and the air guide,

wherein the casing is provided with a number of
exhaust openings through which a portion of an air stream
suctioned by the impeller is discharged, and a
25 circumferential length of each of the exhaust openings is
less than a circumferential distance between outer

peripheral ends of adjacent guide blades.

3. An electric blower comprising:
an electric motor including a stator and a rotor;
5 an impeller being rotated by the electric motor;
an air guide having a plurality of guide blades around
the impeller; and
a casing enclosing the impeller and the air guide,
wherein the casing is provided with a number of
10 exhaust openings through which a part of an air stream
suctioned by the impeller is discharged, and a
circumferential length of each of the exhaust openings is
greater than a circumferential distance between outer
peripheral ends of adjacent guide blades.

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4. The electric blower of claim 1, wherein bottom
surfaces of outer peripheral end portions of volute chambers
are located at a substantially identical level to those of
lower edges of the exhaust openings or located between the
20 lower edges and upper edges of the exhaust openings, each of
the volute chambers being an air passageway formed by two
neighboring guide blades.

5. The electric blower of claim 1, herein outer
25 peripheral end portions of volute chambers are misaligned
with the exhaust openings, each of the volute chambers being

an air passageway formed by two neighboring guide blades.

6. The electric blower of claim 1, wherein a total area S1 of the exhaust openings is less than a total cross sectional area S2 of outer peripheral end portions of volute chambers, each of the volute chambers being an air passageway formed by two neighboring guide blades.

7. The electric blower of claim 1, wherein a total area S1 of the exhaust openings is equal to or greater than a total cross sectional area S2 of outer peripheral end portions of volute chambers, each of the volute chambers being an air passageway formed by two neighboring guide blades.

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8. The electric blower of claim 1, wherein a total area S1 of the exhaust openings is less than a total cross sectional area S3 of an air path between the air guide and the casing.

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9. The electric blower of claim 1, wherein a total area S1 of the exhaust openings is equal to or greater than a total cross sectional area S3 of an air path between the air guide and the casing.

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10. The electric blower of claim 1, further comprising a

bracket enclosing the electric motor, and wherein a total area S1 of the exhaust openings is less than a total cross sectional area S4 of an air path between the electric motor and the bracket.

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11. The electric blower of claim 1, further comprising a bracket enclosing the electric motor, and wherein a total area S1 of the exhaust openings is equal to or greater than a total cross sectional area S4 of an air path between the
10 electric motor and the bracket.

12. The electric blower of claim 1, further comprising a bracket enclosing the electric motor, the bracket having at least one outlet opening through which air supplied therein
15 from the impeller is discharged outside.

13. The electric blower of claim 12, wherein a total area S1 of the exhaust openings is less than a total area S5 of the outlet opening.

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14. The electric blower of claim 12, wherein a total area S1 of the exhaust openings is equal to or greater than a total area S5 of the outlet opening.

25 15. The electric blower of claim 12, wherein a total area S1 of the exhaust openings, a total cross sectional area S3

of an air path between the air guide and the casing, and a total area S_5 of the outlet opening satisfy the following relationship: $S_1 \leq S_3 \leq S_5$.

5 16. The electric blower of claim 12, wherein a total area S_1 of the exhaust openings, a total cross sectional area S_3 of an air path between the air guide and the casing, a total area S_4 of an air path between the electric motor and the bracket, and a total area S_5 of the outlet opening satisfy
10 the following relationship: $S_1 \leq S_3 \leq S_4 \leq S_5$.

17. The electric blower of claim 1, wherein a total area S_1 of the exhaust openings is set to be 40 mm^2 or greater.

15 18. The electric blower of claim 1, wherein there is provided a gap between an outer periphery of the air guide and an inner periphery of the casing.

20 19. The electric blower of claim 1, wherein each of the guide blades is located at about a center of a circumferential width of an exhaust opening.

25 20. The electric blower of claim 1, wherein ribs are provided on an outer surface of the casing above the respective exhaust openings.

21. The electric blower of claim 1, wherein side edges of each of the exhaust openings are inclined at an angle substantially identical to that of bottom surfaces of volute chambers, each of the volute chambers being an air
5 passageway formed by two neighboring guide blades.

22. The electric blower of claim 1, wherein a side edge of each of the exhaust openings is inclined with respect to a longitudinal direction of a rotation shaft of the electric
10 motor.

23. The electric blower of claim 1, wherein the number of volute chambers is the same as that of the exhaust openings, each of the volute chambers being an air passageway formed
15 by two neighboring guide blades.

24. The electric blower of claim 1, wherein each of the exhaust openings is generally of a quadrilateral shape, and a side edge of each of the exhaust openings is inclined with respect to a longitudinal direction of a rotation shaft of
20 the electric motor.

25. An electric blower comprising:
a stator and a rotor;
25 an impeller fixedly installed on a rotation shaft of the rotor;

a casing enclosing the impeller,
wherein the casing is provided with a plurality of
exhaust openings through which a part of an air stream
suctioned by the impeller is discharged, each of the exhaust
5 openings being in a form of a hole.

26. The electric blower of claim 1, further comprising a
motor cover covering the exhaust openings, the motor cover
being open at a downstream side of the part of the air
10 stream.

27. A vacuum cleaner comprising:

a main body incorporating therein a suction inlet for
suctioning dust and an electric blower for generating an air
15 suction stream;

an outlet through which air discharged from the
electric blower is exhausted outside;

a control unit for controlling an operation of the
electric blower,

20 wherein the electric blower including an impeller for
generating the air suction stream by the rotation thereof, a
casing enclosing the impeller, and exhaust openings formed
in the casing through which a part of an air stream
suctioned by the impeller is discharged; and the control
25 unit is disposed on an air path between the exhaust openings
and the outlet.

28. The vacuum cleaner of claim 27, wherein one or more outlet openings are formed in a bracket disposed at a downstream side of the impeller of the electric blower, the
5 bracket constituting the casing of the electric blower.

29. The vacuum cleaner of claim 27, wherein the control unit is retained by a cover enclosing the control unit on the air path.

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30. The vacuum cleaner of claim 29, wherein the cover is provided with at least one air inlet through which an air flow discharged from at least one exhaust opening is introduced into the cover.

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31. The vacuum cleaner of claim 30, wherein the cover is provided with two or more air inlets and the air flow discharged from at least one exhaust opening and that from at least one outlet opening are introduced into the cover
20 via different air inlets.

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32. The vacuum cleaner of claim 30, wherein the cover is provided with an air outlet through which an air stream introduced into the cover is discharged outside after
25 passing through the control unit.

33. The vacuum cleaner of claim 30, wherein a heat generating element of the control unit is disposed in the vicinity of the air inlet of the cover.

5 34. The vacuum cleaner of claim 30, wherein further comprising a guide for guiding an air path between the exhaust openings and the air inlet of the cover.

10 35. The electric blower of claim 2, wherein bottom surfaces of outer peripheral end portions of volute chambers are located at a substantially identical level to those of lower edges of the exhaust openings or located between the lower edges and upper edges of the exhaust openings, each of the volute chambers being an air passageway formed by two
15 neighboring guide blades.

20 36. The electric blower of claim 3, wherein bottom surfaces of outer peripheral end portions of volute chambers are located at a substantially identical level to those of lower edges of the exhaust openings or located between the lower edges and upper edges of the exhaust openings, each of the volute chambers being an air passageway formed by two
neighboring guide blades.

25 37. The electric blower of claim 2, herein outer peripheral end portions of volute chambers are misaligned

with the exhaust openings, each of the volute chambers being an air passageway formed by two neighboring guide blades.

38. The electric blower of claim 3, wherein outer
5 peripheral end portions of volute chambers are misaligned
with the exhaust openings, each of the volute chambers being an air passageway formed by two neighboring guide blades.

39. The electric blower of claim 2, wherein a total area
10 S_1 of the exhaust openings is less than a total cross sectional area S_2 of outer peripheral end portions of volute chambers, each of the volute chambers being an air passageway formed by two neighboring guide blades.

15 40. The electric blower of claim 3, wherein a total area S_1 of the exhaust openings is less than a total cross sectional area S_2 of outer peripheral end portions of volute chambers, each of the volute chambers being an air passageway formed by two neighboring guide blades.

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41. The electric blower of claim 2, wherein a total area S_1 of the exhaust openings is equal to or greater than a total cross sectional area S_2 of outer peripheral end portions of volute chambers, each of the volute chambers being an air passageway formed by two neighboring guide blades.
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42. The electric blower of claim 3, wherein a total area S1 of the exhaust openings is equal to or greater than a total cross sectional area S2 of outer peripheral end portions of volute chambers, each of the volute chambers being an air passageway formed by two neighboring guide blades.

43. The electric blower of claim 2, wherein a total area S1 of the exhaust openings is less than a total cross sectional area S3 of an air path between the air guide and the casing.

44. The electric blower of claim 3, wherein a total area S1 of the exhaust openings is less than a total cross sectional area S3 of an air path between the air guide and the casing.

45. The electric blower of claim 2, wherein a total area S1 of the exhaust openings is equal to or greater than a total cross sectional area S3 of an air path between the air guide and the casing.

46. The electric blower of claim 3, wherein a total area S1 of the exhaust openings is equal to or greater than a total cross sectional area S3 of an air path between the air

guide and the casing.

47. The electric blower of claim 2, further comprising a bracket enclosing the electric motor, and wherein a total area S1 of the exhaust openings is less than a total cross sectional area S4 of an air path between the electric motor and the bracket.

48. The electric blower of claim 3, further comprising a bracket enclosing the electric motor, and wherein a total area S1 of the exhaust openings is less than a total cross sectional area S4 of an air path between the electric motor and the bracket.

49. The electric blower of claim 2, further comprising a bracket enclosing the electric motor, and wherein a total area S1 of the exhaust openings is equal to or greater than a total cross sectional area S4 of an air path between the electric motor and the bracket.

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50. The electric blower of claim 3, further comprising a bracket enclosing the electric motor, and wherein a total area S1 of the exhaust openings is equal to or greater than a total cross sectional area S4 of an air path between the electric motor and the bracket.

51. The electric blower of claim 2, further comprising a bracket enclosing the electric motor, the bracket having at least one outlet opening through which air supplied therein from the impeller is discharged outside.

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52. The electric blower of claim 3, further comprising a bracket enclosing the electric motor, the bracket having at least one outlet opening through which air supplied therein from the impeller is discharged outside.

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53. The electric blower of claim 2, wherein a total area S_1 of the exhaust openings is set to be 40 mm^2 or greater.

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54. The electric blower of claim 3, wherein a total area S_1 of the exhaust openings is set to be 40 mm^2 or greater.

55. The electric blower of claim 2, wherein there is provided a gap between an outer periphery of the air guide and an inner periphery of the casing.

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56. The electric blower of claim 3, wherein there is provided a gap between an outer periphery of the air guide and an inner periphery of the casing.

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57. The electric blower of claim 2, wherein each of the guide blades is located at about a center of a

circumferential width of an exhaust opening.

58. The electric blower of claim 3, wherein each of the
guide blades is located at about a center of a
5 circumferential width of an exhaust opening.

59. The electric blower of claim 2, wherein ribs are
provided on an outer surface of the casing above the
respective exhaust openings.

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60. The electric blower of claim 3, wherein ribs are
provided on an outer surface of the casing above the
respective exhaust openings.

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61. The electric blower of claim 2, wherein side edges of
each of the exhaust openings are inclined at an angle
substantially identical to that of bottom surfaces of volute
chambers, each of the volute chambers being an air
passageway formed by two neighboring guide blades.

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62. The electric blower of claim 3, wherein side edges of
each of the exhaust openings are inclined at an angle
substantially identical to that of bottom surfaces of volute
chambers, each of the volute chambers being an air
25 passageway formed by two neighboring guide blades.

63. The electric blower of claim 2, wherein a side edge of each of the exhaust openings is inclined with respect to a longitudinal direction of a rotation shaft of the electric motor.

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64. The electric blower of claim 3, wherein a side edge of each of the exhaust openings is inclined with respect to a longitudinal direction of a rotation shaft of the electric motor.

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65. The electric blower of claim 2, wherein the number of volute chambers is the same that of the exhaust openings, each of the volute chambers being an air passageway formed by two neighboring guide blades.

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66. The electric blower of claim 3, wherein the number of volute chambers is the same that of the exhaust openings, each of the volute chambers being an air passageway formed by two neighboring guide blades.

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67. The electric blower of claim 2, wherein each of the exhaust openings is generally of a quadrilateral shape, and a side edge of each of the exhaust openings is inclined with respect to a longitudinal direction of a rotation shaft of
25 the electric motor.

68. The electric blower of claim 3, wherein each of the
exhaust openings is generally of a quadrilateral shape, and
a side edge of each of the exhaust openings is inclined with
respect to a longitudinal direction of a rotation shaft of
5 the electric motor.

69. The electric blower of claim 2, further comprising a
motor cover covering the exhaust openings, the motor cover
being open at a downstream side of the part of the air
10 stream.

70. The electric blower of claim 3, further comprising a
motor cover covering the exhaust openings, the motor cover
being open at a downstream side of the part of the air
15 stream.

71. The electric blower of claim 25, further comprising a
motor cover covering the exhaust openings, the motor cover
being open at a downstream side of the part of the air
20 stream.

72. The vacuum cleaner of claim 28, wherein the control
unit is retained by a cover enclosing the control unit on
the air path.